

LAVENDER MONOGRAPH

Lavandula angustifolia P. Mill.



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Lavender

Lavandula angustifolia P. Mill.

syn. *L. officinalis* Chaix syn. *L. vera* DC.



BOTANICAL INFORMATION

Common names: Lavender, English lavender

Scientific name: *Lavandula angustifolia* Mill.

Synonyms: *Lavandula officinalis* Chaix syn. *L. vera* DC.

Botanical family: Lamiaceae

Conservation status: Least concern¹

Description: *Lavandula* is a genus in the Lamiaceae family that includes about 30 species of small flowering evergreen shrubs native to the Mediterranean. The leaves are linear, hoary, and grey-green. The flowers are purple and sparsely arranged at the tips of long bare stalks. Lavender's aroma arises from shining oil glands interspersed amongst the tiny star-shaped trichomes that cover the plant's flowers, leaves, and stems.

Lavandula spp. have been naturalized throughout much of the world; the most widely cultivated species are English lavender (*Lavandula angustifolia*), French lavender (*L. stoechas*), and woolly lavender (*L. lanata*). Lavender essential oil is distilled from the flowers and used in perfumery,

cosmetics, and to flavor beverages, sweets, and ice creams. Dried lavender flowers were a common addition to aromatic sachets used to scent chests and closets.²

Lavender has a long and widespread history of medicinal use. A 17th century Persian medical text describes lavender as “the broom of the brain,” as it is thought to “sweep away impurities.” An Indian medical text dating to the 8th century BCE includes lavender in various psychiatric formulas as an edible ointment or medicinal butter. These traditional preparations are still used in modern Tibetan Buddhist medicine to relieve insanity and psychosis. In European systems of traditional herbal medicine, lavender was primarily used in teas, baths, and pillows as a gentle nervine and mild sedative. Lavender has also been valued in European folk medicine for its spasmolytic, carminative, stomachic, and diuretic properties. Lavender flowers were taken internally to remedy laryngitis, asthma, sinusitis, and candida infections, and applied topically to heal insect bites, burns, and small cuts. Lavender was massaged into the temples to relieve headaches, and into the muscles to ease aches and pains.

Modern sources routinely claim that ancient Romans used lavenders in their baths, thus the common name lavender is assumed to arise from the Latin *lavare*, meaning “to wash.” This attribution may be apocryphal, however, as references to lavender flowers and oil have not been found in comprehensive reviews of Roman bathing practices.³

EXTRACTION INFORMATION

Country of origin:	France, Bulgaria, China, India, South Africa, USA
Part of plant used:	Flowering tops
Extraction method:	Distillation
Essential oil yield:	0.5 – 3%
Color of oil:	Light yellow

AROMATIC CHEMISTRY

Seventy-seven+ components make up 97.3% of the essential oil of *Lavandula angustifolia*. The core components include: linalool (25-38%), camphor (11%), linalyl acetate (25-45%).

Monoterpenes: limonene (<1-8.5%), α-pinene (0.2%), α-thujene (0.6%), α-terpinene (0.3%), β-cymene (2.5-6%)

Sesquiterpenes: β-caryophyllene (3-12%)

Esters: linalyl acetate (27.5%), bornyl acetate (0.1%), lavandulyl acetate (3.4-6.2%), neryl acetate (2.0%), geranyl acetate (3%)

Monoterpenols: linalool (27.2%), borneol (2.5%), terpinen-4-ol (2.1-6%), α-terpineol (<2-4.2%)

Ketones: camphor (0.5-1%)

Ethers (oxides): 1,8 cineole (1-2%), cis-linalool oxide (2.4%)⁴

SAFETY INFORMATION

- No known contraindications.
- GRAS status.

THERAPEUTIC ACTIONS

Musculoskeletal: analgesic, antirheumatic

Skin: cell regenerative (cytophylactic), vulnerary

Cardiovascular system: hypotensive

Nervous system; Psyche/emotion: antidepressant, anxiolytic, nervine, sedative

General: anti-inflammatory, antiseptic, antispasmodic, antiviral

SYSTEM AFFINITIES

Nervous, Skin

BLENDING INFORMATION

Aroma description: Fresh, floral, sweet, herbaceous

Blending factor: 7

Note: Mid note

Blends well with: Most essential oils.

CORE INDICATIONS

Cardiovascular system: hypertension, heart palpitations (from anxiety), tachycardia (I+++ , C+ , D+++ , O+++)

Digestive system: stress-related digestive upsets, including irritable bowel syndrome, abdominal cramps, nervous stomach (O+++ , I+++ , C+++)

Musculoskeletal system: muscular aches and pains, arthritis, sprains, strains, muscle spasms, growing pains, plantar fasciitis, tendonitis, shin splints, rheumatic conditions, joint pain and stiffness, bursitis, cramps (C+++)

Nervous system: restlessness, insomnia, stress, shock, headaches, migraines, neuralgia, nausea, stress related disorders (O+++, I+++, C+++, D++)

Reproductive/endocrine system: calms during delivery, can help reduce severity of contractions (use with clary sage), helps in relieving pain, menstrual cramps, PMS, perineal discomfort and repair following childbirth, wound healing from episiotomy (O+++, C+++, I+++, D++)

Skin: burns (recommend using *Lavandula latifolia* instead or in conjunction with), scrapes, abscesses, acne, athlete's foot, eczema, inflamed skin conditions, psoriasis (as an anti-inflammatory), sunburn, relieves itching, insect bites, hives, open wounds or sores, poorly healing wounds, allergy (expressed on the skin), razor burn, stretch marks (C+++)

Psyche/emotion: calming, soothing, nurturing, irritability, balancing, personal renewal, useful in treating depression (including manic), anxiety, hyperactivity, alleviates fears and delusions, extreme emotions, panic attacks, hysteria, fainting, challenging behavior, limited communication skills, fear of touch, disturbed sleep patterns (I+++, D+++, O+++, Fb+++)

Ayurveda: In Ayurvedic terms, the effect of lavender oil could be described as pacifying to vata (calms, relaxes, and restores the nervous system) and cooling to pitta (anti-inflammatory). It is a highly sattvic oil, meaning that it purifies aggravated emotional states and helps bring mental peace. Lavender Shirodhara showed potent anxiolytic and Altered State of Consciousness-inducing or promoting effects, and induced the largest increase in foot skin temperature.⁵

Traditional Chinese Medicine: Calming to shen, cooling to liver heat, relaxing to liver chi stagnation. For stagnation of liver chi, liver wind, damp heat in the liver and gallbladder, liver Yang rising, heart fire, kidney Yin deficiency with heat.

CODES:

O - Oral	C - Cutaneous pathway (dermal/skin)
D - Diffusion	I - Inhalation
RS - Rectal suppository	Sp - Spritzer/Spray
VP - Vaginal pessary	SI - Steam inhalation
Sz - Sitz bath	FB - Foot bath

+++ - highly recommended, ++ - recommended, + - supportive

RESEARCH

Lavandula angustifolia essential oil has been extensively studied. There are numerous papers to be found on PubMed. We summarize a few of these findings below with a focus on human and animal studies only.

Human Studies

- **A combination of lavender, clary sage, and marjoram provides relief for individuals with dysmenorrhea and reduces menstrual pain.**

A study published in the *Journal of Obstetrics and Gynaecology Research* in 2012 found that abdominal self-massage with essential oils provided relief for outpatients with PD and reduced the duration of menstrual pain. 48 outpatients diagnosed with PD by a gynecologist were divided into two groups. The experimental group received essential oils of lavender, clary sage, and marjoram in a 2:1:1 ratio diluted to 3% in an unscented jojoba cream at a dosage of 2 g/day, while the control group was given a synthetic fragrance diluted in jojoba cream. Demographically, the participants ranged in age from 19-45 years, 77% had experienced dysmenorrhea for over three years, and 50% of the participants had never used analgesics. One criterion of inclusion was that participants had at least one menstrual cycle in the previous year, which the authors charmingly referred to as a “menstrual experience.”

Pain levels were evaluated with a 10-point numeric rating scale (NRS) and verbal rating scale (VRS) pre-intervention, on the first three days of the first menstrual cycle concurrent with the intervention, and post-intervention on the first three days of the subsequent cycle. The researchers observed a statistically significant reduction in the duration of pain in the aromatherapy group but not in the synthetic fragrance group, as well as a greater drop in the severity of pain from the first to the third days of menstruation. None of the participants in the aromatherapy group required analgesics after the intervention.

The researchers also performed gas chromatography on the essential oil blend to identify constituents and found the top five contents to be: linalyl acetate (36.84%), linalool (22.53%), eucalyptol (17.21%), α -terpineol (3.29%), and β -caryophyllene (2.69%). The analgesic effects of the essential oil blend are attributed to these compounds. The authors attempt to tease out potential confounding factors of the effects of massage, writing:

Massage can reduce stress hormone levels by excreting endorphins in the plasma, promoting parasympathetic activation, and increase secretion of the neurotransmitter serotonin to block the conduction of pain. Indeed, massage may possess positive influences on relieving menstrual pain. However, it has no persistent analgesic efficacy, only temporary efficacy... The efficacy of pain relief was due to certain components in the massage cream, and not to the practice of massage itself in our study.

The authors note that aromatherapy has a “positive influence on the autonomic nervous system, releasing anxiety, and controlling pain,” an outcome they attribute not just to the scent of the essential oils, but to transdermal absorption of their chemical constituents. The mechanism of action likely involves inhibition of prostaglandin secretion by linalool, which results in decreased myometrial contractility. Eucalyptol (1,8-cineole), a terpene oxide found in marjoram oil, inhibits the metabolism of arachidonic acid, a precursor to PGs found to have inflammatory effects on human blood monocytes. β -caryophyllene, a terpene, also exerts local anesthetic activity.⁶

- **A combination of Lavender, Clary sage and Rose decreases menstrual cramps.**

A randomized placebo-controlled trial published in 2006 in the *Journal of Alternative Complementary Medicine* found that abdominal self-massage with almond oil and aromatherapy was more effective at relieving dysmenorrhea than almond oil self-massage alone. In this study 67 college students with a menstrual pain ranking of 6/10 or higher on the visual analog scale were divided into experimental, placebo, and control groups. The experimental group performed self massage with 5 cc of almond oil to which essential oils had been added: 2 drops lavender (*Lavandula officinalis*), 1 drop rose (*Rosa centifolia*), and 1 drop clary sage (*Salvia sclarea*). The placebo group performed self massage with 5 cc of almond oil, while the control group received no treatment. Intensity of pain was measured via the visual analog scale, while severity of dysmenorrhea symptoms was assessed with a multidimensional scoring system designed to assess the impact of dysmenorrhea on daily life. Aromatherapy self massage was found to reduce the intensity of menstrual pain compared to placebo and control, as well as to significantly reduce the severity of dysmenorrhea impact on the first and second days of menstruation. Aromatherapy treatment resulted in a pain score drop from 7.40 to 4.26 on the first day of menstruation.⁷

One limitation of these studies is the inconsistency inherent in self massage as part of a treatment protocol. A 2012 study published in the journal of *Pain Management Nursing* controlled for this variable by having one practitioner perform abdominal massage on all the participants at a regularly scheduled time of day. In this trial, standardized abdominal massage with lavender oil was found to be more effective at reducing menstrual pain than massage with odorless liquid petrolatum. The experimental design consisted of a randomized crossover design, wherein 44 volunteers with PD received 15 minutes of abdominal massage with lavender oil or placebo oil. The results were measured via visual analog scale at baseline and post-treatment. Participants were monitored for three menstrual cycles: One observational period without treatment, followed by treatment/placebo for the next cycle, with the treatments swapped across groups in the third cycle. A reduction in pain was observed in both placebo and experimental groups, but the degree of pain reduction was significantly greater in the lavender oil group than the petrolatum group: pain levels as measured by a 100-point VAS scale dropped from 82.38 to 51.13 after aromatherapy massage, compared with 82.38 to 74.31 after placebo massage.⁸

Aromatherapy has also been shown to be effective in treating dysmenorrhea in the absence of abdominal massage, through inhalation alone. The *Annals of Medical and Health Sciences Research* published a study in 2016 on the effect of lavender aromatherapy on pain severity in primary dysmenorrhea. In this triple-blind randomized clinical trial, 200 individuals between the ages of 19 and 29 with PD were divided into two groups. One was exposed to lavender essential oil and the other to diluted milk as a control. Each group received 10 cc of their respective substance and were instructed to drip three drops onto a piece of cotton, and to smell it once daily for 30 minutes on the first three days of their cycle for two consecutive cycles. Pain was quantified via the visual analog scale which was submitted via questionnaire on the cycle previous to treatment (Cycle-0), and the two subsequent cycles. The researchers found that the group exposed to lavender essential oil experienced a statistically significant reduction in pain over the course of two cycles as compared to the control group, which had no such reduction. Pain levels were comparable between the two groups prior to treatment.⁹

Another randomized clinical study published in *Complementary Therapies in Medicine* in 2014 found that inhalation of lavender essential oil significantly reduced symptoms of primary dysmenorrhea. In this study 96 Iranian students suffering from PD were divided into two groups. The experimental group was given lavender essential oil diluted in sesame oil at a ratio of 2:1, while the placebo group used sesame oil alone. The subjects were instructed to place three drops of the oil on their palms, rub them together, place their hands at a distance of 7-10 cm from their noses, and inhale for five minutes. This treatment was administered one hour following the onset of dysmenorrhea symptoms, and repeated every six hours for the first three days of menstruation for two consecutive menstrual cycles. Results were measured via a researcher-developed questionnaire based on existing dysmenorrhea literature and designed to assess symptoms intensity from light to severe/debilitating. The volume of menstrual bleeding was measured by a pictorial blood assessment chart before and after treatment. Researchers found that inhalation of lavender significantly reduced symptoms of dysmenorrhea compared to placebo. Menstrual volume was reduced, though the data was not statistically significant, and there was no effect of lavender inhalation on the presence of blood clots.¹⁰

- Inhalation of lavender (scientific name not given) essential oil **relieves anxiety and reduces cortisol levels** in candidates for open-heart surgery.¹¹
- Inhalation of lavender (*Lavandula angustifolia*) essential oil reduces stress and improves sleep quality in patients in intensive care unit.¹²

- **Lavender inhalation exhibits relaxing activity.**

The results revealed that lavender oil caused significant decreases of blood pressure, heart rate, and skin temperature, which indicated a decrease of autonomic arousal. In terms of mood responses, the subjects in the lavender oil group categorized themselves as more active, fresher relaxed than subjects just inhaling base oil.¹³

Animal Studies

- Lavender (*Lavandula angustifolia*) essential oil exhibits **anxiolytic and sedative activity**.^{14,15}
- Lavender (*Lavandula angustifolia*) essential oil **exhibits anxiolytic activity**.^{16,17,18}
- Lavender (*Lavandula angustifolia*) essential oil **exhibits local analgesic activity**.¹⁹
- Lavender (*Lavandula angustifolia*) essential oil exhibited an **anti-stress effect** and **decreased anxiety and social avoidance** without causing intense sedation.²⁰
- Lavender (*Lavandula angustifolia*) essential oil exhibits **anti-inflammatory activity**.²¹
- Dermal application of lavender essential oil (2% dilution) reduced inflammation and exhibited anti-nociceptive activity.²²

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